Name

Muhammad Shuja-at

Roll No

38(m)

Assignment

Bio mecnics

Topic

Forms of motion

Submitted to

Sir Qasid Naveed

Semester

4th

Department of sport Sciences

University of Sargodha

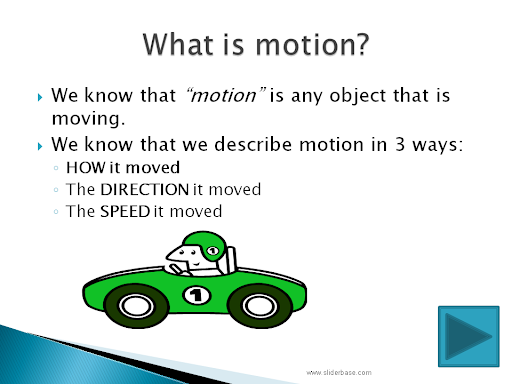
Contents

* Definition of motion
* Curvilinear motion
* Non-linear motion
* Angular motion/ Rotation
* Angular motion about and internal axis
* Angular motion about and external axis

**MOTION**

“A body is said to be at rest , if it does not change its position with respect to its surroundings”

“In [physics](https://en.wikipedia.org/wiki/Physics), **motion** is the change in the position of an object over [time](https://en.wikipedia.org/wiki/Time). Motion is mathematically described in terms of displacement, [distance](https://en.wikipedia.org/wiki/Distance), [velocity](https://en.wikipedia.org/wiki/Velocity), [acceleration](https://en.wikipedia.org/wiki/Acceleration), [speed](https://en.wikipedia.org/wiki/Speed), and [time](https://en.wikipedia.org/wiki/Time).”



**Examples of motion in life**

* Stretching.
* Bending.
* Walking.
* Dancing (almost **daily** in some fashion or another ;)
* Lifting.
* Reaching (not vis-a-vis “stretching” but reaching for objects)
* Digging (garden)
* Wrist turning (bottle caps, jar lids

**FORMS**

1. Linear motion/ translation
   * + - * Rectilinear translation
         * Curvilinear translation
         * Non –linear motion
2. Angular motion /rotation
   * + - * Angular motion about and internal axis
         * Angular motion about and external axis

**Linear Motion**

Straight line motion of a body is called linear motion



Example

1 ) the motion of the objects such as car moving on a straight and level road is leaner motion

2) Airplane flying straight in air

3) Objects falling vertically down are also a example of linear motion

**Rectilinear translation**

Rectilinear motion is another name for straight-line motion. This type of motion describes the movement of a particle or a body. A body is said to experience rectilinear motion if any two particles of the body travel the same distance along two parallel straight lines

**Example**

* Planes in the sky that move in a straight path are considered to be in rectilinear motion.
* A ball rolling down an inclined path is considered to be in rectilinear motion.
* People marching at the San Francisco Pride Parade are in rectilinear motion.

**Curvilinear translation**

**Curvilinear motion** is defined as **motion** that occurs when a particle travels along a curved path. The curved path can be in two dimensions (in a plane), or in three dimensions. This type of **motion** is more complex than rectilinear (straight-line)**motion**.



**Examples**

1. Cyclist racing on curved tracks of velodrome.
2. Earth moving around the sun.
3. A car taking a turn on a road.
4. Throwing of a javelin.

Motion of a snake

The **motion** of an object moving in a curved path is called curvilinear motion.Example: A stone thrown into the air at an angle. Curvilinear motion describes themotion of a moving particle that conforms to a known or fixed curve

**Non –linear motion**

**Nonlinear motion** is **motion** along a curved path; i.e., the combination of two 'components of **motion**' horizontal **motion** (without acceleration) vertical **motion** (under the acceleration of gravity)

**Example**

* Earth revolving around the sun.
* A car moving in a highway with **uniform** speed.
* The hour and minute hand moving in a clock.
* A bob of pendulum in a clock.

. **Angular motion /rotation**

he **motion** of a body about a fixed point or fixed axis, as of a planet or pendulum. It is equal to the angle passed over at the point or axis by a line drawn to the body.



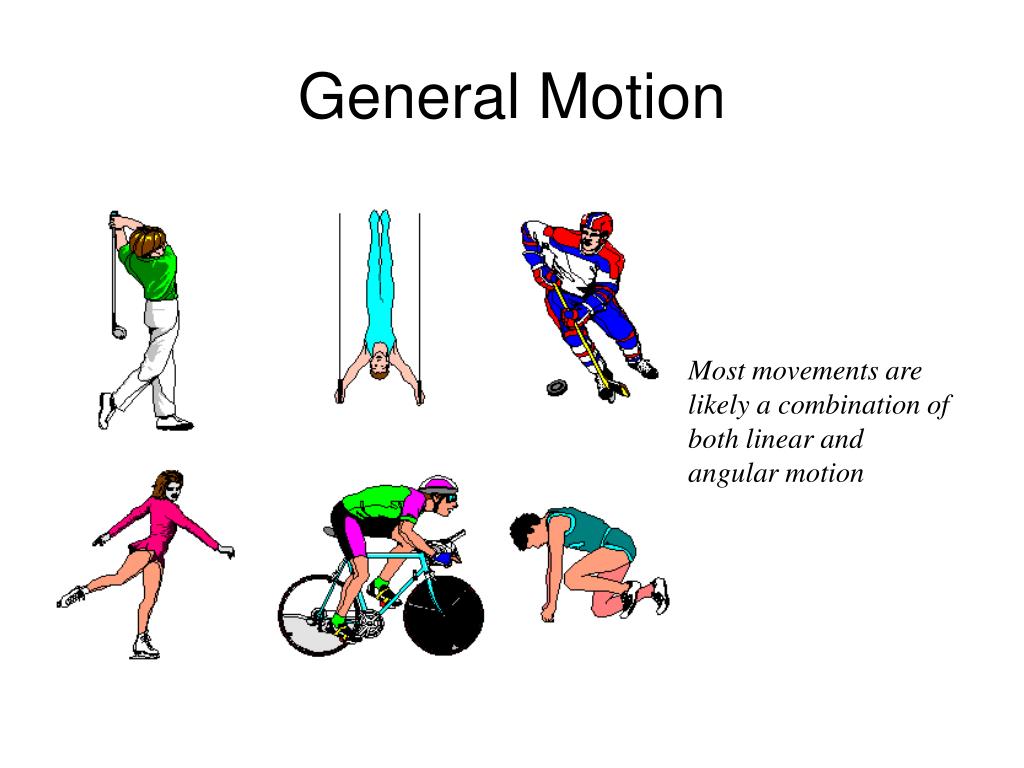
**Example**

* Virtually any club, stick, bat, racket that is swung.
* A gymnast going around the high bar.
* A runner on a circular track.
* Essentially anything that is turning, twisting, or rotating is an **example** of **angular**

**General Motion.**

General motion is a combination of linear and rotary motions. General motion is the most common type of motion in sport and physical exercise. Running and walking are among typical examples. ... Riding a bicycle is another example of general motion

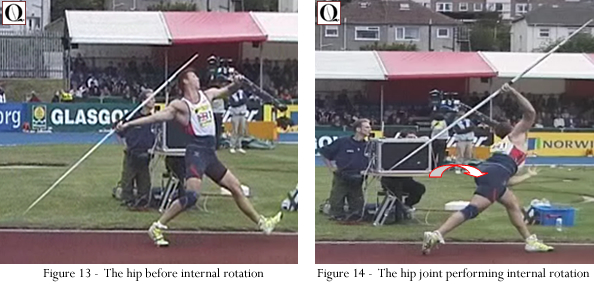
**General motion** is the most common type of **motion in sport** and physical exercise. Running and walking are among typical **examples**. In this case the trunk moves in linear **motion** as a result of rotary **motions** of individual segments of extremities. Riding a bicycle is another **example of general motion**.



**Angular motion about and internal axis**

Rotational dynamics. These definitions apply to objects spinning about an **internal axis**, such as a wheel spinning on its axle, or to objects revolving around a point external to the objects, such as the earth revolving around the Sun. A spinning or revolving object has **angular velocity** ω.

**Motion at Internal Axis**

Rotational dynamics. These definitions apply to objects spinning about an **internal axis**, such as a wheel spinning on its axle, or to objects revolving around a point external to the objects, such as the earth revolving around the sun. A spinning or revolving object has **angular velocity** Rotational dynamics. These definitions apply to objects spinning about an **internal axis**, such as a wheel spinning on its axle, or to objects revolving around a point external to the objects, such as the earth revolving around the sun. A spinning or revolving object has **angular velocity**

**Example: hammer throw**

**Angular motion about and internal axis**

When a body moves on it .it is motion on external axis

**Motion at External Axis**

If the **axis** passes through the body's center of mass, the body is said to **rotate** upon itself, or spin. A **rotation** around an **external** point, e.g. the planet Earth around the Sun, is called a revolution or orbital revolution, typically when it is produced by gravity. The **axis** is called a pole.

An **axis** that is outside the body. For example, the high bar in gymnastics is the **external axis** around which the gymnast rotates.



**Example:** gymnastic bar